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Magnetic fluctuations in the Martian ionosphere

The Martian ionosphere is influenced by both the solar wind and the regional magnetic fields present in the Martian crust. Both influences ought to cause time variable changes in the magnetic fields present in the ionosphere. I report observations of these magnetic field fluctuations in the Martian ionosphere. I use data from the Mars Global Surveyor magnetometer instrument. By using data from the aerobraking low altitude passes (~ 200 km) I find that there are numerous fluctuations both near and far from the strong crustal sources. Using data from the 400 km altitude mapping phase (which is near the topside of the primary ionosphere), I look at the comparative strength of the fluctuations relative to the solar wind and temporal variations. I discuss which wave modes and instabilities could be contributing to these fluctuations. I also discuss the implications of these fluctuations for understanding energy transfer in the Martian system and the effects on atmospheric escape.